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[54] **METHOD FOR FABRICATING  
SEMICONDUCTOR DEVICE HAVING  
GROUP III NITRIDE**

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438/688; 438/796**

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**ABSTRACT**

First, n-type contact layer of GaN, n-type cladding layer of AlGaIn, active layer of InGaIn, first Mg-doped layer of AlGaIn and second Mg-doped layer of GaN are grown in this order over a sapphire substrate. Thereafter, the substrate, including the second Mg-doped layer, is exposed to nitrogen plasma for about 40 minutes. As a result, Mg, which has been introduced into the first and second Mg-doped layers, is activated as an acceptor. Thus, p-type cladding layer and p-type contact layer with low resistance and excellent crystallinity can be formed out of the first and second Mg-doped layers, respectively.

**15 Claims, 9 Drawing Sheets**